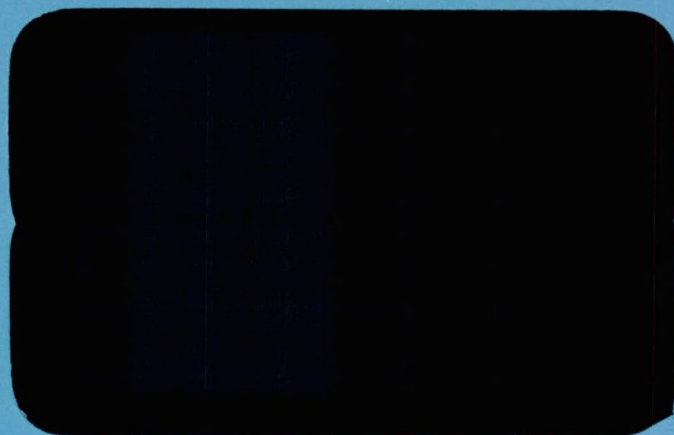COMMISSION ON EDUCATIONAL PLANNING

POSITION

PAPER

COMMISSION ON EDUCATIONAL PLANNING

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EDUCATIONAL FACILITIES

by

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The purposes of these papers are to bring to the attention of the Commission informed points-of-view regarding a series of issues, to suggest basic concepts or principles to guide planning and development at all levels of education in the years to come, and to project contemporary thought into the future.

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EDUCATION FACILITIES

Many existing models illustrate what factors affect education facilities. Some are more complex than others but all have shown that influencing factors, whether they be social or physical, have a high degree of interaction. This interaction and the inherent interaction between the myriad of sub-concerns that constitute each major factor have not been accounted for in practice; nor have their alternatives been given sufficient attention. Thus, this paper first, in Section A, identifies the major factors affecting educational facilities used to construct most models, and describes possible alternatives for each. The attempt throughout is to relate the factors to each other in the hope of providing a positive base for future research and eventual implementation. Section C deals with this aspect in more particular detail. Complexity and change are perhaps the salient characteristics of the last third of the 20th century. Thus, Section B of the paper discusses these issues as they affect education facilities in order to dispel some myths and hopefully open new vistas.

A. Major Factors Affecting Educational Facilities

Broadly, these factors can be termed thus: (1) Location, (2) Environmental Requirements, (3) Equipment, (4) Activities, (5) Behavioral Patterns and (6) Group Size.

1. Location

There are two extreme views regarding school location. One suggests the concentration of facilities on a massive scale, the other

decentralization by completely meshing the education facility with the community. The university is usually an example of concentration, and primary schools are often examples of a form of partial decentralization, in that each school is a unit with all components closely related, but distributed throughout settlement regions.

a. Concentration, or the educational park concept. By centralizing educational and community facilities for a number of districts of differing ethnic and economic character, this concept is aimed at "providing the disadvantaged with access to facilities of the highest quality in a socially integrated environment,"[1] while achieving economies of scale. This notion is to put together a complex of schools on a campus-like site, sharing common facilities, specialist staff, plant, mechanical services and the other elements of the required physical plant. Educational levels could range from elementary through secondary to college, if the objective is to cater to all community groups. These parks would be ideally situated at "bridging points" of areas of different socio-economic levels, thereby making integration possible. Special transport would be needed for those living beyond walking distance. However, U.S. experience shows that the bulk of those using education parks in downtown areas are within walking distance of the facility. In the education park some "home base" facilities would provide a sense of identity, while other facilities such as auditoria, gymnasia, athletic fields and library would be shared. These can also be shared by the

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[1] C. Abel, R.I.B.A. Journal (No. 2, 1970)

community at large, as well as the formally enrolled student. They can, in fact, become a focus of community activity.

This concept has the potential of being a powerful urban renewal tool. By infusing new amenities and upgrading programs, it would help to break the poverty cycle characteristic of many inner city areas.

A problem in providing new facilities in built up areas is the lack of space. An answer to this problem, which avoids the bulldozer, is to build over the air-rights of public transit lines. This has the added, and important, advantage of making this form of education facility highly accessible. Thus the use of this form of organizational education park would not be a function of proximity but of activity, organization and accessibility.

b. Decentralization or the dispersed condition. This concept sees the fabric of the multi-functional city with its movement systems, variety of spaces and amenities as a highly desirable educational environment. It suggests educational involvement be achieved as the interests of education institutions and the city coincide. Libraries, laboratories and workrooms, training programs and lecture series found in government, commercial and industrial complexes throughout the community could be used in common. Special facilities could be added to the inventory, and introduced into deprived communities for strategic renewal purposes and educational use.

Electronic information networks consisting of highly developed storage and retrieval systems (ex-libraries) can link widely dispersed receiver stations at any required location - home, classroom, study carrel

or auditorium. As these terms sound exceedingly futuristic, it is interesting to note that the beginnings of such systems can now be found in Philadelphia (Parkway School program), Bedford Stuyvesant Community College, and are about to be introduced in Toronto at the high school level.

From these seemingly opposite views of the school, a number of common concepts emerge. Obviously the two views differ in that the educational park relies on physical proximity, high residential density and large scale new development, whereas the dispersed condition seeks to utilize the existing city space and amenity inventory, only supplemented where it is most necessary. But both seek to achieve economies through a shared-use of facilities. Both seek involvement with community. Both are seen as tools for renewal. Both conceptually separate hardware and software. <u>Once the hardware of education can be considered as functioning separately from the software, especially in administrative terms, a whole new range of forms for education becomes possible.</u>

Between the above poles lies the more usual practice in the distribution of schools.

The present system of resource allocation and delegation of responsibility for education to local authorities has given rise to huge disparities in the quality of education. Middle and upper income groups have tended to gravitate to the suburbs either leaving the centre city to lower income groups, or to apartment dwellers with low demands on education. Thus a paradoxical situation occurs whereby the centre city is

often deprived of much of its tax base, yet with higher land costs has
the greater education cost burden to bear. The suburbs, on the other hand,
are generally wealthier, land costs are lower and better facilities can be
afforded. The problem is heightened in the U.S.A. where the disparity has
also resolved itself in terms of colour.

Accessibility is a sub-concern that is often not fully apprecia-
ted: while downtown areas are characterized by high accessibility via
public transport, the reverse is true in the suburbs. Because the emphasis
in suburban (low residential density) development has been on private
mobility, at the expense of public service, transportation for those not
old enough to drive has become a restraint on the choice of education
facilities.

There are, therefore, attempts to plan facilities and programs
that promote general city-wide social, racial and economic as well as
educational progress. Outdated schools in downtown areas are being
replaced with modern educational complexes, with the latest in special
equipment, in the hope of luring middle class families back from the suburbs.
However, a more systematic definition and evaluation of alternatives is
needed, or as the Educational Facilities Laboratory has stated "No longer
can schools be located by spot map, putting schools wherever the dots
(children) are clustered."

If educational planning is to move "freely" in any direction,
what is required is maximum choice for both educator and student, i.e.,
the ability to specify explicitly what educational activity will take
place in a required space, and what environmental demands it will make
on that space. When schools are viewed as groupings of space components,

then the entire system can be seen as an inventory of these components which individual schools can use. Schools can then be structured according to different educational goals. Some of the variables of such a system would be accessibility, degree of specialization of equipment, location of spaces, mix and interface, areas of population concentration, activity concentration and the ages for which the facility will cater.

2. Physical Environmental Requirements

These can be stated simply in terms of performance standards such as illumination levels, air temperature, ventilation rates, noise reduction, sound quality, glare ratios, colour and space standards. These factors can be precisely measured, communicated and tested.

While all are capable of being incorporated into design today, they seldom are. Because standards, like building codes, are somewhat arbitrary and variable, they are unevenly applied. Clearly, more information and technical data about the physical aspects of education exists than is now used. What is urgently needed is a system to set physical standards, evaluate practice, modify standards and make their application comprehensive and universal. Too often in practice only some standards are used, a qualitatively different process to accommodating all.

3. Equipment

(a) The actual use of a space is normally determined by equipment housed rather than the size of space, i.e., same size spaces function as classrooms, laboratories, lecture rooms, etc. In terms of life span and investment, the equipment is more easily

changed or renewed than is the building envelope. Thus "neutral" spaces may be designed in such a way as to accept a wide range of services or equipment.

(b) Control and flexibility problems are magnified each time varied activities or new instruments are introduced into the environment. Thus, careful study should be made of the environment. Thus, careful study should be made of the relationships between sizes of space and the equipment used in order that the kinds of service and environment necessary for the optimum functioning of equipment can be supplied.

(c) Hospitals and other science-oriented buildings already demand that every work station be equipped with every service for which a future need can be anticipated. They build on the maximum number of auxiliary spaces, labelling them instrument rooms, preparation rooms, etc. It is clear that there is a doubt that moveable partitions or demountable walls will be used to create more spaces as needs arise.[2]

(d) While on the one hand there is the argument for flexibility, there is on the other, the argument for single purpose space. If the new teaching media are to be fully utilized, not only is there a need for a greater variety of space for individualized instruction but there will have to be more space as well.

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[2]H. Horowitz, Can the Environmental Sciences Affect Planning (Address to 2nd Annual Conference, Society for College & University Planning, August, 1967)

Large areas or parts of a building can be frozen for a
single purpose: "Students will rotate in and out of the spaces
on a scheduled basis and these spaces will need to be environ-
mentally conditioned to reinforce their purpose. Thus it would
seem there should be a move away from light "flexible" structures
we have recently come to know."[3]

(e) Delicate instrumentation requires careful control of dust,
temperature and humidity. The conditioning of space will limit
the degree to which space can be used for other purposes and the
degree to which economies can be achieved through structural
simplification. Contrary to the current trend towards increasing
uniform brightness, darker spaces will be required for the use of
most audio visual media.

4.   Activities

Techniques used in the cognitive process can be divided into six
dominant categories:[4]

a. <u>Dissemination</u> involves the dissemination of information from
transmitter to receiver. In classic form, of course, this involves the
teacher, acting as a lecturer, imparting information to students. The role
of the teacher/transmitter is active and the receiver is passive. Dissemin-
ation also involves individual study whereby the transmitter is a book or
other forms of information storage.

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[3]C.F. Lehmann, <u>The New Media and Education</u>

[4]Bruce J. Biddle & Peter H. Rossi, <u>The New Media and Education</u>

b. Doing. The student learns by participation - the teachers role is minimal; he acts as a leader or monitor.

c. Exchange involves two way interaction between the teacher and individual students. This process imparts knowledge to the group through incisive question and answer exchanges with individuals, for example, in seminars.

d. Discussion. The students communicate one with another while the teacher supervises or directs. In addition to providing role-playing opportunities for students, discussion provides them with access to information from sources not tapped in more traditional strategies.

e. Counselling/Tutorial is usually based on a direct person to person dialogue between teacher and student or student and student.

f. Individual Study. Each of these techniques has particular sets of group size and dynamics with which it is associated, as well as particular environmental, spatial and equipment requirements. Much work needs to be done to identify the specific requirements in order that reliable criteria can be established.

5. Behavioral Patterns

Most planners and architects share the view that the behavioral sciences offer great promise for reaching better solutions in the future through improvement in ability to describe the environment and perhaps to understand the kinds of responses that are influenced by physical surroundings. "The greatest hope is that behavioral sciences will help our predictive ability and lead to the discovery and achievement of goals

that will have general acceptance."[5]

The terms "city", "building", "house" and "room", etc., are historically pre-conditioned terms which bias and inhibit the logical and behavioral aspects of problem solving. Similarly, the listing of names currently given to spaces in educational facilities not only does not reveal the nature of the activities housed, but prevents us from gaining insights into the nature of the activities, and hence their requirements. "The architects brief today, that consists of a schedule of spaces for a one-off building is probably the most restrictive bar to progress we have, for its existence means that the owner has already decided some major planning issues, and the role remaining to the architect is only a juggler of spaces conceived by the client."[6]

As Horowitz indicates, the behavioral sciences offer particular promise for improvement in planning techniques. It seems likely that some of the sampling and information gathering techniques already developed in the social sciences may help improve planning criteria, and to provide a better understanding of preferences and requirements, better insights into the operational problems of educational institutions, and an understanding of the decision-making processes for the design of education facilities.

Raymond G. Studer, in The Dynamics of Behavior Contingent Physical Systems, makes the point that the design disciplines are moving towards a research consensus whereby knowledge, not of products, but of

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[5]H. Horowitz, Can the Behavioral Sciences Affect Planning?

[6]Peter Manning, Pilkington Research Unit, The Primary School - An Environment for Education

processes, becomes cumulative, what is critically needed now in environmental design is a unit of analysis both relevant and empirically accessible. The most commonly accepted design unit is human need. Need is made apparent through behavior. Behavior has characteristics which are relevant, empirically verifiable and operationally definable. A new taxonomy of problem formulation is in order, one which clearly identifies the continuum of highly differentiated events and which characterizes human life in a particular context.

Although there is a great need for research into practically every aspect of design for education facilities, the most serious lack of knowledge is the function, purpose, use and future of education facilities. There is some progress on <u>how</u> to build but very little on <u>what</u> should be built. There is a need to ascertain individual and community needs in relation to education facilities, establish criteria, and design and appraise buildings in terms of these criteria. Before this can happen, however, we require increased research of new kinds. A new way of regarding buildings from the <u>behavioral</u> point of view will have to be developed, one which views a building's space not as solids or as bricks and mortar, but enclosures which house human activities and sensations. It will involve the observation of man in his environment so that what is studied is not what users say about their buildings, but how they are observed to use them and how they adapt them to their needs.

The conceptual and consequently the technical issues which must eventually be dealt with involve the following operations:

(1)   Defining the requisite behavioral system.

(2)   Specifying the requisite physical system.

(3)   Realizing the requisite physical system.

(4)   Verifying the resultant environment - behavior system.

At present the criteria necessary for implementing the first operation are as lacking as is the necessary information for their formulation.

In the U.S.A. a beginning has been made by instituting research into environmental effects and human response in education.[7] There needs to be more of it, carefully consolidated and directed so it can be applied systematically to the design and appraisal of educational facilities.

A paper entitled Procedures for Physical Facility and Utilization Studies, by F.E. and B.J. Schwehr, Wisconsin Coordinating Committee for Higher Education, October 1967, is a start in attempting to classify and group space generically, by use.   Their objective is to develop a methodology for gathering such data as the availability of facilities and how they are presently being used.   One of the premises of the study is that the development of factors for the projection of facility needs requires that spaces be grouped in a manner consistent with these factors.   The usual terms for such spaces as "cold room", "balance room", "barber shop", "studio" are substituted with terms which relate activities to the spaces which they accommodate.   This system then explicitly defines, in terms of

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[7]H.W. Himes, D.H. Carson, C.T. Larson & others, School Environments Research (Michigan University, Ann Arbor, E.F.L. Inc. 1965)

use and equipment, the categories of space and related activities and eventually delineates a methodology for determining the utilization of existing facilities, in order to reveal future needs.

To make this a useful basis for determining generic space categories there is a further need to develop, in terms of the criteria described, ways to make such a system generally usable for any local educational authority or jurisdiction.

6. Group Size

a. <u>Individual private study</u> involves the use of various media. Traditionally and predominantly this involves books. Strong preferences are presently shown for study in small spaces, where a student can work alone, or with one or two others. Students generally dislike the large library reading room although they will use it for lack of a better facility.[8] The implication is that, in addition to the conventional library, space for individual study could be home based with access to information via audio-visual media.

b. <u>Seminar Groups</u>. The number of participants can vary between three and fifteen. The seminar group relates to discussion and exchange techniques described above.

c. <u>Classroom</u>. The classical classroom accommodates fifteen to forty. There should be enough classrooms to accommodate 15 percent to 40 percent of students enrolled - provided there are a sufficient number

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[8]H. Horowitz, <u>Can Behavioral Sciences Affect Planning?</u>

of smaller and individual study stations.[9] Activities relate to "dissemination" and "exchange" categories and also to "doing", i.e., with more specialized equipment such as for a laboratory.

d. Team Teaching requires a different kind of space. There needs to be more of it than conventional classroom arrangements, assuming that at least two groups will come together at certain times. The minimum space segments for a team teaching two groups should include customary classrooms of $\pm$1,000 square feet, each capable of being combined, plus library and project areas of $\pm$600 - 800 square feet.[10] Given the objections cited in this paper to moving walls, it thus becomes necessary to provide permanent spaces of this order of magnitude, designed specifically for this particular activity.

e. Large Groups. Up to 300 students are grouped in one area for instruction by one or more specialist teachers or by the various audio visual media (TV and movies). Considerable logistical support is required in terms of electronic services and teaching aids, the involvement of other instructional areas, and the preparation of material (C. F. Lehmann). Activities would include lectures, demonstrations and the dissemination of universal and unspecialized topic or subject matter appropriate to large groups.

B. Flexibility and Change

"Neither education nor the use of buildings is static.

[9]H. Horowitz, Can Behavioral Sciences Affect Planning?

[10]C.F. Lehmann, The New Media and Education

Educational policies change, new teaching techniques are developed. School buildings never remain as architects leave them."[11]

"We should abandon the finite state problem solving commitment (the "solution") in favor of realizing experimental settings which respond to dis-equilibrium on a continuing basis," (R. Studer).

The most prevalent concern among architects and educational planners today should be change - how changes in all aspects of education will affect school buildings. But attempts to make buildings "flexible" in order to accommodate change, to date have often only been cloaks for indecision. Flexibility has a number of meanings: convertible, adaptable, divisible, sub-divisible, movable, changeable, multipurpose, varipurpose. It can involve possible additions to the main plant to meet future enlargement or structural change. It can involve changes made over a period of years, during summer months, weekly changes or even over a weekend. It can mean rapid changes of space sizes and configurations by moving partitions or it can merely mean the moving or installing of furniture.

Among the alternatives there are a few common methods employed to meet the varied requirements of educational programs. At one end of the design spectrum is "idiosyncratic space," that is space, designed for a particular activity. Idiosyncratic spaces which conform too closely to particular requirements are rendered obsolete by small changes of requirement. At the other end of the design spectrum is "universal space." By

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[11]P. Manning, R.I.B.A., 8-68, Primary Schools - Design for Use Today and Tomorrow

attempting to accommodate all possible needs within one volume (with perhaps half height partitions segregating activities), universal space accommodates none satisfactorily. An example of such an attempt to be all things to all men is the multi-purpose concert hall. Such halls attempt to cater to all ranges of sound, from speech to chamber music to symphony music to organ recitals. The reverberation time required for speech and chamber music is about one second or less, for symphony 1.5 to 2 and for organ about 4. An effective compromise can be reached between two adjoining forms, (chamber and symphony, or symphony and organ) but not for all.

The "place" or physical environment where teaching and learning occurs varies in terms of the **object** or who is taught (individuals, different sized groups) what is taught (subject) and how it is taught (medium). Thus, of the interacting sources of change (which include changes in an organizational goal structure, changes in physical environment, changes in other stimulus domains, for example social, economic or changes in the human organism) the physical environment ranks high as a changeable variable. Some of the options available for its change in response to various educational needs include:

(a) Moving walls

(b) Moving spaces

(c) Moving people

(d) Moving information

a. <u>Moving Walls</u>. The objective of most attempts to date to accommodate change in educational facilities has been to achieve a malleable space, one that can be shaped at once and at will to suit any set of circumstances. Notable examples are the Californian SCSD and the

Metropolitan Toronto SEF projects. Their principles outlined in this statement are from the SEF report: "The principle of mutable spaces will find ready adoption for academic spaces, thereby increasing the freedom to group children at will and to diminish the spaces that otherwise but now necessarily lie idle in many schools." And "... it would appear that though divisibility costs more than non-divisibility, the overall effect is to diminish the cost, to increase utilization, and to accommodate more sensitively the kind of academic arrangement of teacher and pupil, collegiate in principle, towards which many schools are moving."[12]

This attitude towards flexibility is regarded by some as a panacea for schools of the future. In the way it is being tested and marketed, this system could generate many positive benefits, especially in terms of the rationalization of the building process. But how it is going to cope with the more fluid notions of school, with the growing commitment to community involvement, with the new kinds of relationships possible via media, remains to be demonstrated. And no conclusive answer to the questions about "flexibility", raised in this paper, have yet been provided.

Questions to be answered include: (1) How will the existing and heavy investment in plant be utilized? and (2) what difficulty will there be in changing mechanical services? (3) Will costly "flexibility" be utilized? (4) are moveable walls truly soundproof? A further question which has not been asked and which is by far the most significant is the

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[12] E.F.L., <u>Schools for Tomorrow</u> (Architectural Record, May 1960)

one which challenges the notion of the discrete schoolhouse: it would seem that systems such as the SEF program are still tied to the traditional notion of "school" as defined by a building or series of buildings, on a site or campus, devoted entirely to the use of the institution.

b. Moving Spaces. The idea of the changeable space package has been developed from the mobile classroom, used to meet sudden increases in enrollment. Depending on particular requirements a portable or demountable space, containing a choice of equipment relating to particular teaching needs, could be attached to an education facility, and, when no longer required, moved elsewhere. Some school systems in the U.S.A. require 1/5 to 1/4 of the total space inventory to be mobile. A graduate student study of such space modules (Carter Hill and Lloyd Jones, University of Toronto) shows that while demands for different amounts of spaces do occur, most demands for change are being generated by the need for different equipment. Thus, within limits, the size of space packages could be kept fairly constant, while varying the equipment component. This is not as difficult to accomplish as it would seem. The ordinary household, without changing its basic structure, often changes over the life span of the shell, its electrical, mechanical, plumbing and appliance components. If structures are designed to accommodate this form of change, no structural changes would be necessary when equipment or service changes are made.

c. Moving Information. "On the one hand we move equipment, on the other hand bodies - and that which we really want to move is information, for particular and selected purposes, at a particular and selected time, to a particular and selected place."[13]

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[13]Architectural Design, May 1968

Media such as TV not only make the environment instantly variable, but also the observer's relationship to it. Electronic communication can tie remote areas together instantaneously, in a manner which can provide a new kind of flexibility for programming and use of space. Thus it is this development which extends the planning horizons for education facilities. Learning areas can be spread around a campus, around a community, around a city or even a region, linked only by a TV and computer network.

Obviously this more sophisticated use of media means increased costs per pupil but relative to the expected outcome of such an educational process, perhaps these costs are negligible.[14] There is a danger, when reviewing alternative education facility systems, to oversimplify. Use of the media is not a panacea. It is merely an added tool for the instructional kit, which may, in skilled hands, produce a more sophisticated product. But because space could, in this way, be designed for a shorter academic life, it would be able to accommodate other functions as academic needs decrease. Thus school facilities could be incorporated into mixed use developments, for example, housing/commercial buildings, and could expand or contract on demand. Spaces for education could thus be leased, and not built, thereby reducing capital expenditure.

Discussions of the potentials of technology, while providing alternatives to current practice, frequently ignore social needs. These in fact may, while rendering systems inefficient, or in fact precluding

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[14]C.F. Lehmann, The New Media in Education

their utilization, be of significantly greater importance. For example, it may be more important for people to use a library for social cruising rather than as a "locus for information gathering."

d. Moving People. An alternate to the provision of "flexible" facilities (accommodating change within themselves) is the provision of a wide mix of facilities. By making available an inventory of large spaces, medium spaces, independent study areas, especially equipped spaces (in terms of environment or plant), facilities could be rescheduled as needs dictate. This idea of "space management" involves merely the efficient management of existing or proposed inventories of particular kinds of space. Educational space may either be housed within a centralized facility, or dispersed throughout the city. People would move between appropriate spaces rather than vice versa; thus the educational environment becomes a tool or instrument rather than a receptacle.

As studies of behavioral patterns and activity requirements become more clearly identified, it is my firm conviction that the provision of generic categories of space, neither too specific nor too general, will hold the greatest promise for satisfaction. Each category will accommodate a range of activities not necessarily associated with today's conventional description of different sizes of space. Further, the distribution of these spaces will depend on locational conditions and potentials. Thus each space will serve its activity, and the context in which it is placed, to greatest advantage.

C. Methodology

The two major problem areas in educational facilities research

involve (a) coordinating and applying the mass of existing research on "physical" aspects of facilities; and (b) determining what direction new research should take.

1. The Use of Existing Research

    (a) More information and data about the "physical" aspects of educational facilities exists than is used. The problem now is how to apply it to design.

    (b) Standards, although not always ignored, are unevenly applied. Too frequently one factor is considered at the expense of another. The problem is to integrate into the design of education facilities acceptable environmental standards in a systematic way.

    (c) Some architects feel a moral obligation to give each client an entirely original concept; others, often firms with established and successful practices, give clients an expected product. Consequently, feedback, which could be used to accelerate experience and derive general principles, is virtually non-existent. Without structured checks, mistakes are being repeated endlessly. Designing each building as if it were the first of its kind cannot be justified, in that it becomes impossible to give each project the necessary attention for a comprehensive solution. This knowledge resulting from systematically recorded experience and research is not incorporated in design today.

    (d) The purpose, function, use and future of education facilities

is nowhere adequately defined, at least for use of designers. Therefore, designs tend to be greatly inhibited by the working habits and attitudes of building owners and users imposed by past experience.

2. Direction of New Research

(a) As no generally accepted set of detailed criteria for education environment exists, design is being based on assumption or habit. If design is to be based on knowledge, a concentrated effort must be made in the following areas:

i. recording and synthesizing activities;

ii. interpreting the professional purposes and requirements of school users;

iii. providing an understanding of individual and group subjective needs and their responses to the physical environment;

iv. developing an understanding of briefing processes and design methods and exploring the construction of performance specifications appropriate to the emerging technology;

v. formulating performance specifications for spaces to house identified activities;

vi. Studying the consequences of alternative design solutions in relation to educational concerns, such as physical, intellectual, social or emotional.

(b) Two major communications devices, (i) Educational Specifi-
cations and (ii) Performance Criteria, developed in the
U.S.A., are worthy of further investigation, if only to cull
techniques for a third:

i. Educational Specification. This device is a more
sophisticated form of the traditional architect's brief. It
specifies such items as descriptions of philosophy and pur-
pose of planning educational facilities, school and personnel
organization, or activity relationships. The Educational
Specification is defined as "a well organized, concisely
written statement of an instructional program which is to be
housed by the new school plant. Educational Specifications
constitute the problem - the architectural plans and school
plant constitute the solution..... The primary purpose is
communication of the educational process to the architect."[15]
The failing however, is that the specifications are still
written in terms of preconceived concepts of space use. They
are mainly concerned with quantitative aspects at the expense
of qualitative ones.

ii. Performance Criteria. This concept, as a superior alter-
native to the formulary standards typical of most building
codes in the specification of requirements, is gaining fast
acceptance.

[15]H.L. Cramer, Preparation of Educational Specifications,
(Florida State Department of Education)

"They are a means of communication for which the
building industry has felt dire need, not only to
help free the industry from the hand-wrought
methods that are limiting its productivity, but
also to free the design professions from the pro-
scriptions of formulary standards that have tended
to freeze inventiveness and artistry especially in
buildings that are controlled by public funds."16

Performance criteria can encompass both physical and behavioral

considerations, in that they ultimately relate environmental performance

to human comfort, safety and efficiency.

Although there has been a vast amount of research done in the

past in areas such as acoustics, lighting, or climate, it has been re-

lated neither to a particular building program or to other research.

Therefore, few results of this research have been implemented, and

divergent opinions have confused the building industry. As a result,

the standards that have been adopted by the design professions have not,

in fact, been developed scientifically. Those primarily responsible for

setting these standards have merely been sections of industry involved

in the development and sale of products and services.

The New York State University Construction Fund has recently

made a positive step toward correcting this by developing a library of

performance criteria as a massive tool for upgrading building productivity

in its campus construction program. It is seen as "a series of documents

each pertaining to a specific area of concern. These documents undertake

to relate the function of a building project to the means for

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16R.G. Jacques, Performance Criteria (Architectural Record, May
1966)

its accomplishment in generic terms compatible with the state of the art, rather than specific formulas of area, structure, degree or material."[17] Their research relates to the environment, function, operation and maintenance. The objective of this system is to provide a communications device that would allow those involved in the various areas of the building process to understand more fully areas other than their own. In this way the efforts of the various contributors to the program are rendered.

A system created by combining the education specification and performance criteria systems could be the appropriate tool or device. A performance specification system could relate particular educational requirements to criteria for their satisfaction in environmental terms and consequently the environmental criteria related to behavioral characteristics would generate improved physical performance specifications.

If general and recurring problems are isolated and considered against a range of conditions, it would then be possible to devise "pattern books" of practical solutions, technological equivalents to the pattern books used by builders in the Georgian period, but taking into account knowledge gained from research and experience of production. These would relate the physical performance specification to means for

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[17]R.G. Jacques, _Performance Criteria_ (Architectural Record, May, 1966)

realization in physical terms, and be improved as new research

findings are made. The patterns then could provide a basis for

standardization and industrialization.

We must, however, exercise caution in consolidating

the "hardware specifications", for fear of imposing undue restraints

on the "software". A system such as the performance specification could

become as restrictive as it is innovative. We might question whether

there is any need to provide physical configurations of the performance

specification as generic "solutions" at all. In devising "a pattern

language that generates multi-service centres"[18] Christopher Alexander

argues that in order to expedite use and feedback and consequent

discussion and modification of the patterns, it is necessary to pro-

vide a generic physical solution.

Alexander sees the "pattern" as a re-usable design idea which

integrates physical, technical and behavioral alternatives, dependent

on very careful extraction of those elements which generically are

common to a series of situations.

Thus it becomes possible to establish hierarchies of design

decision-making stages, by establishing design sub-systems. These sub-

systems provide some limits to the amount of design data to be integrated

at any one time.

Now that education is depending more upon complex and expensive

equipment, it is possible the development drive will come from a new

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[18]Roger Montgomery, _Pattern Language_ (Architectural Forum
January, 1970

educational industry that regards buildings as just another tool. In

the opinion of Peter Manning, the initiative in design (but not in

briefing) will also come from these groups:

> "Educational industrial groups will interpret the
> performance specification stated by the user
> authorities as type designs which properly balance
> and implement the results of experience and research.
> Building type designs will be devised for general
> use over a fixed period during which there will need
> to be constant evaluation and feedback, culminating
> in redesign of the type.

> A corollary to changes in design approach will be
> changes in the administrative overburden. Effec-
> tive advantage cannot be taken of increasing
> knowledge and mastery of technology (including the
> economic advantages of industrialization and mass
> production) while design decisions continue to be
> made at the local level, let alone in respect of
> individual jobs. For years now local authorities
> have combined in consortia for the design and
> purchase of constructional systems. The time has
> surely come when these combinations should be
> developed to deal with the vastly more important
> questions of the interpretation of educational
> policies and their application to the design of
> buildings.

> All this will have important consequences for the
> architect. In the near future the school architect
> is likely to employ his skills not, as now, as an
> independent designer on the periphery of the build-
> ing industry, but interchangeably within the sub-
> systems of the educational system. Within the user-
> oriented sub-system he will be an analyst, deter-
> mining user-requirements by drafting performance
> specifications. Within the industry-oriented sub-
> system he is likely to have a greater choice. He
> might (a) design "industrialized" systems and com-
> ponents, or (b) assemble type-designs of entire
> projects to meet performance specifications.

> Much of this is usefully put in the context of school
> design by a quotation from Progressive Architecture.

'In the future --- the architectural profession
will be under pressure to abandon many of its
present individualistic attitudes .... The
architect as a master planner will disappear,
because the plan itself will be for a system to
which the physical environment will be an
accessory.... If (the architect) is able to re-
conceive the role and nature of architecture, then
this offers him the opportunity to make architec-
ture a lot more important as a social institution
than it is now. He can be dealing with a whole
system of which a building is just a part. He can
start to raise and concern himself with questions
a lot more important and exciting than those he
currently engages himself with in the design of a
building. If the problem is a school he becomes
a member of a complex interdisciplinary enterprise
designed to produce a better school - not a better
building - but a better school. And that will in-
volve a better building, better teaching, better
students, everything, rather than keeping (school
architecture) off to one side as something that is
done after all the other important problems have
been solved."[19]

D. Conclusion

The red school house was once the physical counterpart, in

educational terms, to particular social requirements and physical

conditions. It was a solution to a particular circumstance. And it

was eminently successful. The schools and universities provided today

seek, with not a little nostalgia, a solution to a problem. But there

is no longer one problem or one condition to cater to. No metaphysic

will reveal an absolute answer. Thus education facilities cannot be

designed by formulae, but in response to a particular set of social

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[19]Peter Manning, Primary Schools: Design for Use Today and
Tomorrow, R.I.B.A. Journal, August 1968.

economic and physical circumstances. If the range of factors is truly taken into account, facilities will be designed according to need. These facilities will, because conditions vary widely, differ widely. In responding to varying requirements we will thereby provide another urgent requirement today - choice.

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